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REPORT

INFORMATION REPORT

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Research in the Academy Institute for
Research on the Physics of Solids, Berlin-
Buch

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1. Dr. Helmut Simon, head of the Structure Research Department of the Academy Institute for Research on the Physics of Solids in Berlin-Dach has been engaged during the last four years (1951 to 1955) in the study of cadmium-sulfide (CdS) cells and their application to X-Ray dosimetry. He has carried out this study, first in the framework of a basic research program aimed at the clarification of problems pertaining to crystal structure and second with a view to the technical application of CdS cells as X-ray dosimeters, particularly in the field of electrotherapy. Simon was assisted in this work by: Dipl. Phys. Hans Thiel; Dipl. Phys. Gerhard Eichhoff; Schnuerer (fnu); Schweinberger (fnu), who worked in Simon's department; and by Dr. Wilhelm Muscheid and Dr. Wilhelm Michael Buttle, who both worked in the Optics Department of the Institute.
2. As a whole, Simon's personal work in the Institute is not considered to have been very successful. A research project concerning the construction of an X-ray dosimeter with a CdS cell was completed in 1953; a model of the device was delivered to an industrial enterprise producing electrotherapeutic instruments. No other model has since been built. The theoretical ideas underlying Simon's work, and which he elaborated during a period of several years, have been proved wrong by other Institute personnel. When studying the qualities of CdS crystals for the purpose of determining their adaptability to X-ray dosimetry purposes, Simon scanned the surface of CdS cells with a fine X-ray in the region between the two electrodes. The results indicated that the electric current released by the X-ray was strongest in a region very near the cathode. He did not become aware of the fact that this "effect" was caused by the poor quality of the cells used by him. What actually happened was that his X-ray neutralized the barrier layer between crystal and cathode and, thus generated a relatively strong current. Subsequently, Dr. Muscheid and Dr. Buttle, of the Optics Department, prepared CdS crystals of better quality without barrier layer; these cells were turned over to Schnuerer, who investigated them by scanning with X-rays. He found the results he had expected, namely that the released current was strongest in the middle between the electrodes. Simon's "discovery" has been jokingly referred to in the Institute as the "Beethoven effect". Simon has been formally left in charge of his department, but most of the men working

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3. In early 1955, Dipl. Phys. Gerhard Eichhoff completed the development of a spectrograph for ultra-soft X-rays in the wave-length region 10 to 100 angstrom.

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his development is for the time being not intended for economic-industrial use but serves for the structure analysis purposes of the Institute.

4. In late 1954, Schnuerer started the development of an X-ray monochromator. The preparation of the designs lasted until early July 1955. Designing of the model was completed by that time and the actual construction work is to begin shortly. The purpose of the device is for structure investigations with the aid of X-rays of defined wave length. The device is to work on the basis of the monochromator-reflection principle: X-radiation falls upon a crystal (presumably quartz) which is bent spherically and the X-rays are reflected separately according to their different wave lengths. It is expected that the building of the device will take a year and that initial tests and necessary improvements will take about six more months.
5. Thiel is working on photo-current changes caused in CdS cells by infra-red light radiation applied in addition to normal light or X-ray radiation of given wave lengths (Ultrarotausleuchtung). Previously he was engaged, with Dipl. Phys. Heinz Karl Diedrich of the Electronics Department, in structure investigations of selenium crystals and selenium layers.
6. Schweinberger (fnu) was with Simon's department until late 1954. He was mainly engaged in X-ray structure investigation of CdS crystals under Simon's direct supervision. When he failed to pass his examination in late 1954, he was dismissed from the Institute.
7. Kessler (fnu) worked in Simon's department until late 1954. he completed a small Van de Graaf generator with maximum output of 500 KV. Although the Institute reports on this development repeatedly mentioned the possibility of its being used as a model for the development of higher-output generator for the Academy Institute in Miersdorf, the small generator built by Kessler never served this purpose and was never seriously intended for it. Kessler's generator is still in the Institute, but has not been used since Kessler's departure.
8. While every research project undertaken in East Germany is ultimately supposed to serve production purposes, it may be stated that the work of the Structure Research Department of the Berlin-Buch Institute has been, and is, mainly concerned with basic research problems. This is true, except that the X-ray dosimetry research program was undertaken with view to basic research and to its application in electrotherapy.

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